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ABSTRACT

The purpose of this study was to examine the effects of a comparative advance organizer in an oral format on learners' immediate and delayed retention of subject matter related to food and nutrition when controlling for learners' prior knowledge level. Another area of interest was to investigate whether paraphrasing the comparative advance organizer prior to receiving oral instruction would be an effective strategy to help learners when encoding an advance organizer and the subsequent material. Thirty-two high school students in two food service classes in Alabama provided the sample for the study. Subjects were tested for prior knowledge of foods and nutrition and then randomly assigned to one of three treatment conditions: (1) oral comparative advance organizer, treatment one; (2) oral comparative advance organizer plus paraphrasing, treatment two; and (3) no oral comparative advance organizer, treatment three. The advance organizer was a 239-word introductory passage that incorporated the theory of meaningful verbal learning of D. Ausubel (1963). An analysis of co-variance was used with prior knowledge level as the co-variate to determine whether there were significant differences between treatment groups after controlling for prior knowledge. Findings show that no single treatment condition was more effective in facilitating immediate and delayed retention of text. In addition, subjects paraphrasing the comparative advance organizer did not show a positive influence on recall of the subject matter. (Contains 7 tables and 39 references.) (SLD)

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EFFECTS OF AN ORAL ADVANCED ORGANIZER ON IMMEDIATE AND DELAYED RETENTION

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ABSTRACT

The purpose of this study was to examine the effects of a comparative advance organizer in an oral format on learners' immediate and delayed retention of foods and nutrition subject matter when controlling for learners' prior knowledge level. More specifically, to determine whether students retained more foods and nutrition material when it is introduced with an advance organizer, than when it is not. Another area of interest was to investigate whether paraphrasing the comparative advance organizer prior to receiving oral instruction would be an effective strategy to help learners when encoding an advance organizer and the subsequent material. Thirty-two high school students enrolled in two food science classes at Fairhope High School, Fairhope Alabama participated as the sample for the study.

Subjects were initially tested for foods and nutrition prior knowledge using a Prior Knowledge Questionnaire. After testing, subjects were randomly assigned one of three treatment conditions: Treatment one (oral comparative advance organizer), Treatment two (oral comparative advance organizer plus paraphrasing), and Treatment three (no oral comparative advance organizer).

An analysis of covariance was used with prior knowledge level as the covariate to determine whether there were significant differences between treatment groups after controlling for learners' existing knowledge of foods and nutrition. The findings revealed that no single treatment condition was more effective in facilitating immediate and delayed retention of text. Additionally, subjects paraphrasing the comparative advance organizer prior to receiving the oral instruction failed to demonstrate a positive influence on subjects' recall of foods and nutrition material.

INTRODUCTION

An area of particular interest to researchers and educators has been the development of techniques to enhance students' learning and retention (Snapp & Glover, 1990). The concept of advance organizers to facilitate learning was first introduced by Ausubel (1960) as a practical implication of his theory of meaningful verbal learning.

This theory, more commonly known as the theory of subsumption, focuses on "how learners' prior knowledge and its organization determine learning. During meaningful learning the person organizes, 'subsumes' or incorporates, the new knowledge into the old knowledge. The advance organizer operates as a schema" (West, Farmer, & Wolff, 1991, p. 118).

According to Ausubel (1968), it is possible in situations in which the learners' cognitive structure may lack adequate subsumers to provide relevant anchoring concepts prior to learning. He calls such material an advance organizer. An advance organizer is defined as:

> . . . appropriately relevant and inclusive introductory materials . . . introduced in advance of learning . . . and presented at a higher level of abstraction, generality, and inclusiveness than the information presented after it. The organizer serves to provide ideational scaffolding for the stable incorporation and retention of the more detailed and differentiated materials that follows. Thus, advance organizers are not the same as summaries or overviews, which comprise text at the same level of abstraction as the material to be learned, but rather are designed to bridge the gap between what the learner already knows and what he needs to know before he can successfully learn the task at hand. (p. 148)

In general, advance organizers have been conceptually determined to fall into two categories: "expository and comparative." Expository organizers function to provide the learner a conceptual framework for unfamiliar material, and comparative organizers are used when the

knowledge to be acquired is relatively familiar to the learner. The comparative organizer functions to integrate new concepts with similar concepts already in the learner's existing cognitive structure (Ausubel, 1968). In addition, they "increase discriminability between new and existing ideas which are essentially different but confusably similar" (p.149).

During the 1960's, Ausubel and his colleagues published a number of reports which provided the empirical and theoretical underpinnings for the effects of advance organizers on learning and retention of materials (Ausubel, 1960; Ausubel & Fitzgerald, 1961; Ausubel & Youssef, 1963). Since the publication of Ausubel's original work, some of the studies conducted have revealed a facilitative effect of advance organizers on students' learning and others have not.

Thirty years of research documents the fact that the use of advance organizers significantly increases comprehension in learners whose prior knowledge is inadequate to provide an essential assimilative framework (Williams & Butterfield, 1992a). Research has been conducted in a variety of areas: mathematics, science, social studies and religion. Moreover, advance organizers have been shown to be effective for all types of learners, from elementary school students to college graduates as well as with students of varying ability levels (West et al., 1991).

Reviews using a variety of analytic techniques (meta-analysis, t-statistics, voting techniques) indicate that advance organizers do facilitate learning (Luiten, Ames, & Ackerson, 1980; Mayer, 1979a; Stone, 1983). However, studies evaluating such variables as age, ability, and presentation format of advance organizers have yielded inconsistencies.

One of the major concerns regarding advance organizers has been their effectiveness. More specifically, the lack of clarity in the definition and the criteria for construction (Ausubel, 1978; Barnes & Clawson, 1975; McEneay, 1990). Hartley and Davies (1976) reviewed the different functions of advance organizers, overviews, objectives, and pretests. They concluded that advance organizers may be the most effective means of clarifying material for learners. They are difficult to construct, however, because there is no specific protocol. Ausubel (1978) says that the specific construction of advance organizers will depend on the subject matter, learners, and the desired learning outcome.

Mayer (1979a) described the basic characteristics of an advance organizer:

> (a) short set of vocal or visual information, (b) presented prior to learning a larger body of to-be-learned information, (c) containing no specific content from the to-be-learned information (d) providing a means of generating the logical relationships among the elements in the to-be-learned information, and (e) influence the learning and encoding process. (p. 382)

Mayer suggests that advance organizers will be most beneficial for learners when they lack an assimilative context for the information, the material is unfamiliar and/or does not posses prior knowledge.

Clark and Bean (1982) suggest in their recommendation on ways to improve advance organizer research:

> One "rule of science," long accepted as a requirement for meaningful scientific investigations, which current and past organizer research have not met is, the principle of operational definition . . . Without such operational definitions the scientific activity not only loses its ability to be replicated, but, since the variables are incompletely specified, any conclusions are unwarranted and the project is rendered meaningless. (p.5)

In a review of Ausubel's subsumption theory and studies conducted by Ausubel and colleagues, McEneany (1990), described several methodological inconsistencies. He concurred with Clark and Bean (1982) that the operational definition and failure to control for learners' prior knowledge of subject matter were discrepancies found in the studies reviewed.

The purpose of this study was to investigate the effects of a comparative advance organizer in an oral format on the immediate learning and delayed retention of high school students in foods and nutrition. More specifically, to determine whether students retained more foods and nutrition material when it is introduced with an advance organizer, than when it is not. Another area of interest to the investigator was to determine whether paraphrasing the comparative advance organizer prior to receiving instruction would be an effective strategy to help learners when encoding the advance organizer. Several studies (Corkill, Bruning, Glover, Krug, 1988; Dinnel & Glover, 1985; Glover, Bullock, & Dietzer, 1990) have employed strategies for allowing learners to more completely process the information in the organizer. Additionally, the study examined whether the prior knowledge level of the learner should be controlled when using comparative advance organizers.

The primary questions for this study were:

1. Is there a statistically significant difference in immediate retention between the experimental group receiving Treatment one (oral comparative advance organizer) and the group receiving Treatment two (oral comparative advance organizer plus paraphrasing) when controlling for learners' prior knowledge level?

2. Is there a statistically significant difference in delayed retention between the experimental group receiving Treatment one (oral comparative advance organizer) and the group receiving Treatment two (oral comparative advance organizer plus paraphrasing) when controlling for learners' prior knowledge level?
3. Is there a statistically significant difference in immediate retention between the experimental group receiving Treatment one (oral comparative advance organizer) or the group receiving Treatment two (oral comparative advance organizer plus paraphrasing) and the group receiving Treatment three (no oral comparative advance organizer) when controlling for learners' prior knowledge level?
4. Is there a statistically significant difference in delayed retention between the experimental group receiving Treatment one (oral comparative advance organizer) or the group receiving Treatment two (oral comparative advance organizer plus paraphrasing) and the group receiving Treatment three (no oral comparative advance organizer) when controlling for learners' prior knowledge level?

METHODS

Subjects for the study were selected from the population of high school human science students enrolled in the food science course at Fairhope High School, Fairhope, Alabama (Baldwin County). The sample included a total of 44 students in two food science classes. Subjects for the study represented grade levels 9 through 12, both males and females (see Table 1). Twelve subjects, who did not participate in the entire testing process, were eliminated from the study. Subsequently, a total of 32 students participated in the three treatment conditions. The

classes were comprised of students who had both foods and nutrition prior knowledge and those who did not.

Treatment Group	Grade 9	Grade 10	Grade 11	Grade 12	Gender
Treatment one (oral comparative advance organizer)	1	2	3	3	6F, 3M
Treatment two (oral comparative advance organizer plus paraphrasing)	1	1	5	3	5F, 5M
Treatment three (no oral comparative advance organizer or paraphrasing)	3	0	6	4	9F, 4M

Note:
F= females
M= males

Table 1 : Description of Subjects by Grade and Gender

Subjects were randomly assigned to treatment groups using student identification codes and a table of random numbers (Gay, 1992). The experimental groups were tested using foods and nutrition instruction with an oral comparative advance organizer or an oral comparative advance organizer plus paraphrasing treatment presented prior to instruction. The control group received the same foods and nutrition instruction without the oral comparative advance organizer. The study was conducted over a period of four days, during the regularly scheduled 96-minute class session during April and May, 1996. During the time the study was in progress subjects were participating in their regularly scheduled course activities which involved a food preparation instructional unit based on the food guide pyramid.

RESEARCH DESIGN

The study employed a Quasi-Experimental Design (Gay, 1992). Two intact classes were used. Students were initially tested for prior knowledge using a Prior Knowledge Questionnaire developed by the investigator. They were then randomly assigned to one of three treatment conditions: (a) oral comparative advance organizer, (b) oral comparative advance organizer plus paraphrasing, and (c) no oral comparative advance organizer (control group). All group received the same foods and nutrition instruction. Immediately following the completion of the treatment each group was given an immediate posttest. A delayed posttest was administered 10 school days following treatment. Table 2 depicts the research design used for the study.

O1	R	X1	O2	O3
O1	R	X2	O2	O3
O1	R	X3	O2	O3

R: randomization to treatment group
X1: treatment: Oral comparative advance organizer
X2: treatment: Oral comparative advance organizer plus paraphrasing
X3: treatment: No oral comparative advance organizer (control group)
O1: prior knowledge questionnaire (pretest)
O2: immediate posttest
O3: delayed posttest (10 school days later)

Table 2: Research Design

INSTRUMENTS

The effectiveness of the treatment conditions were determined by using a posttest and a delayed posttest. Based on a sample size of 32, the Cronbach's alpha reliability coefficients for the posttest and delayed posttest were calculated as .72 and .54 respectively. The posttest and delayed posttest were designed to insure mastery of each objective in the lesson. The mastery of major concepts in the lesson are important in the overall selecting of foods for a healthful diet and the implementation of the Dietary Guidelines and the Food Guide Pyramid. The point value is given in a hierarchial fashion to correspond to the type of learning outcome specified in the lesson objectives. The verbal information concepts are given the lowest point value per item and the intellectual skills (rule) the highest point value. Both tests are equal in content and responses. The tests are comprised of short answer, multiple-choice, and matching items. The posttest was given immediately following the treatment. A delayed posttest was administered 10 school days later to measure delayed retention of the foods and nutrition subject matter. Both the immediate and delayed posttests were developed by the investigator. Students were informed that their course grade would not be affected by participation in the study.

To determine subjects' prior knowledge level, a 20-item multiple-choice Prior Knowledge Questionnaire was developed by the researcher. The reliability of the Prior Knowledge Questionnaire was computed as .55, employing Cronbach's alpha. Low reliability may have been observed due to the limited number of items included on the questionnaire and small sample size. The Prior Knowledge Questionnaire was given to the subjects before they were randomly

assigned to the three treatment conditions. The questionnaire is based on the lesson objectives and lesson content. Content and face validity was determined by two instructional designers and three Alabama Cooperative Extension System educators with subject matter expertise in foods and nutrition.

TREATMENT MATERIALS

To test the hypothesis, the instructional materials dealing with foods and nutrition subject matter were developed based on the Principles of Instructional Design suggested by Gagne', Briggs, and Wagner (1992). The learning outcomes for the foods and nutrition instruction are categorized as: rules, defined concepts, concrete concepts, and verbal information. The text of the lesson incorporated current research-based information on the Food Guides Pyramid and the Dietary Guidelines for Americans (U.S. Department of Agriculture & U.S. Department of Health and Human Services, 1992, 1995). The content for the instruction is based on the Alabama State Department of Education (1990). The purpose of the lesson was to present rules, concepts, and verbal information that would help students select foods low in fat and saturated fats using food labels. The lesson has three primary topics: fatty acids found in foods, nutrient content claims, and visible and less-visible fats. Each section of the lesson has its own practice activities to increase learners' retention of the information and skills. The performance objectives for the instructional lesson were developed based on Mager's criteria for writing performance objectives (Dick & Carey, 1990).

The comparative advance organizer, a 239-word introductory passage, incorporated principles of Ausubel's theory of meaningful verbal learning (1963). Translated into operational

terms, West et al. (1991)guidelines for advance organizers were used to develop the comparative organizer.

The treatment materials were evaluated for readability using the Flesch-Kincaid readability formula (WordPerfect 6.1 for Windows, 1994). The grade level was computed as 9.50. The lesson was evaluated by two instructional designers and one Alabama Cooperative Extension System educator for quality of instructional design and accuracy of subject matter.

The study was implemented during the 96-minute class sessions over a period of four days. During day one (96-minute class session), the prior knowledge questionnaire was given to the experimental and control groups. Subjects were told that they had 20 minutes to complete the prior knowledge questionnaire. They were given oral directions on how to complete the demographical information. Written directions were provided for completing the questionnaire. Students were told that if they had questions they were to inform the teacher. The purpose of the prior knowledge questionnaire was to determine how much learners already knew about using the food guide pyramid and the nutrition facts label.

On day two, intact classes of subjects were randomly assigned to one of three treatment conditions. After which students comprising the no oral comparative advance organizer (control) group was removed from the classroom and taken to the Foods Laboratory in the Human Sciences Department. The no oral comparative advance organizer treatment (control group) was supervised and instructed to read information provided on 101 Ways to Save Money (Turner, 1995). The oral comparative advance organizer plus paraphrasing group paraphrased the organizer in writing. The group was provided a blank sheet of paper for paraphrasing the

organizer. Subjects were allowed 20 minutes to paraphrase the organizer. During this time the oral comparative advance organizer group was supervised and instructed to read the same material as the no oral comparative advance organizer (control group). When the time allotted for paraphrasing the organizer had expired, both the oral comparative advance organizer and the no oral comparative advance organizer were returned to the classroom for the start of the instruction. Subjects assigned to the oral comparative advance organizer treatment condition and the oral comparative advance organizer plus paraphrasing treatment both received the same organizer. The only difference in the two treatment conditions was the oral comparative advance organizer pus paraphrasing group was instructed to paraphrase the organizer in writing before receiving foods and nutrition instruction. Subjects assigned to the no oral comparative advance organizer treatment (control group) received foods and nutrition instruction without the oral comparative advance organizer.

On day three, the instructor completed the lesson and the immediate posttest was administered to the experimental and control groups. Prior to beginning the posttest, subjects were provided oral directions on completing the demographical information. Written directions were included for each section of the posttest. Subjects were told to inform the instructor if they had questions regarding the test. Students were allotted 20 minutes to complete the posttest.

On day four, 10 school days later, a delayed posttest was administered to all of the groups to measure delayed retention of the lesson content. Subjects were told that they had 20 minutes to complete the delayed posttest. Prior to beginning the delayed posttest, oral directions were given on how to complete the demographical information. Written directions were included for each

section of the delayed posttest. Subjects were told to inform the teacher if they had any questions pertaining to the test.

RESULTS

Means and standard deviations are presented in Tables 3 through 5 for the three treatment conditions. The total possible score for all criterion measures was 100. Table 3 shows that subjects in Treatment one and Treatment two had lower mean scores on the prior knowledge questionnaire than subjects participating in Treatment three (control group). A total of 31 subjects were administered the prior knowledge questionnaire. The mean score for the entire sample on the prior knowledge questionnaire was 39.19. Table three indicates that data are missing for one subject on the prior knowledge questionnaire. The data in Table 4 show that the mean score for subjects comprising Treatment one and Treatment two were lower on the posttest than the mean scores for the control group. The delayed posttest data are given in Table 5 and indicated that the mean scores for Treatment one and Treatment two were lower for the delayed posttest than the subjects participating in the control group. Additionally, the data indicate that the subjects assigned to Treatment one had a higher mean score on the delayed posttest than on the posttest.

Table 3

Descriptive Statistics for Three Treatment Groups on Prior Knowledge Questionnaire

Treatment group	N	Mean	Standard Deviation
Treatment one (oral comparative advance organizer)	9	38.89	18.67
Treatment two (oral comparative advance organizer plus paraphrasing)	9	36.67	11.98
Treatment three (no oral comparative advance organizer or paraphrasing)	13	41.15	14.74

Table 4

Descriptive Statistics for Three Treatment Groups on Posttest

Treatment Group	N	Mean	Standard Deviation
Treatment one (oral comparative advance organizer)	9	62.78	22.11
Treatment two (oral comparative advance organizer plus paraphrasing)	10	69.30	14.47
Treatment three (no oral comparative advance organizer or paraphrasing)	13	70.54	18.66

Table 5
Descriptive Statistics for Three Treatment Groups on Delayed Posttest

Treatment Group	N	Mean	Standard Deviation
Treatment one (oral comparative advance organizer)	9	67.11	6.13
Treatment two (oral comparative advance organizer pus paraphrasing)	10	67.10	19.16
Treatment three (no oral comparative advance organizer or paraphrasing)	13	69.77	10.70

ANALYSIS OF DEPENDENT VARIABLES

Thirty-two subjects were given a posttest. The reliability of the posttest was determined using the Conbach's alpha reliability coefficient. Based on the scores obtained from the sample, the reliability coefficient was computed as .72. The coefficient for the delayed posttest was .54.

The analysis of covariance (ANCOVA) for the three treatment conditions for the posttest and delayed posttest are reported in Tables 6 and 7. Table 6 shows the performance of the three groups on the posttest. The data show after controlling for learners' prior knowledge there were no significant differences among the mean scores on the posttest for the three treatment conditions. The data in Table 7 show there were no significant differences among the three groups in regard to the delayed posttest.

Table 6
Analysis of Covariance for Three Treatment Groups on Posttest

Source	df	Sum of Squares	Mean Squares	F-Value	P-Value
Covariate	1	939.256	939.256	3.025	.093
Group	2	481.771	240.885	.776	.470
Residual	27	8383.530	310.501		

$p < .05$

Table 7
Analysis of Covariance for Three Treatment Groups on Delayed Posttest

Source	df	Sum of Squares	Mean Squares	F-Value	P-Value
Covariate	1	203.624	203.624	1.207	.282
Group	2	29.503	14.752	.087	.917
Residual	27	4555.573	168.725		

$p < .05$

DISCUSSION

The results of the study indicated that when controlling for subjects' prior knowledge, no single treatment condition was more effective in facilitating immediate or delayed retention of foods and nutrition text. The comparative advance organizer used in the study showed no positive impact on subjects' recall of foods and nutrition material. The assumption by Ausubel

and colleagues (Ausubel, 1960; Ausubel & Fitzgerald, 1961; Ausubel & Youssef, 1963) that advance organizers facilitate learning and retention of material was not substantiated in the study. Furthermore, the study found no evidence to support the position of previous research findings that paraphrasing advance organizers assist learners in encoding the organizer and subsequent text.

An interesting finding of the study was that the control group had higher mean scores on all the criterion measures than the experimental groups. These differences may be attributed to randomization or random error. In a series of previous studies (Corkill, Bruning, & Glover, 1988; Glover, Bullock, & Dietzer, 1990; Rinehart & Welker, 1992) that have included control groups, the learners comprising the advance organizer treatment conditions have achieved higher mean scores than those in the control groups.

CONCLUSIONS

The four research questions formulated for the study provided the basis for the hypothesis tested in the investigation.

1. Is there a statistically significant difference in immediate retention between the experimental group receiving Treatment one (oral comparative advance organizer) and the group receiving Treatment two (oral comparative advance organizer plus paraphrasing) when controlling for learners' prior knowledge level?

This question anticipated that subjects comprising the group participating in Treatment two would have significantly higher mean scores than the group receiving Treatment one.

Treatment two was employed because recent research (Corkill, Burning, & Glover, 1988; Dinnel, & Glover, 1985) affirms paraphrasing the organizer as an effective strategy for increasing learners' recall of the organizer and the subsequent material. The posttest mean scores associated with the two treatment groups show Treatment two score to be 69.30 and 62.78 for Treatment one. According to the results of the analysis of covariance, no significant differences were observed between the groups participating in Treatment one and Treatment two when learners' prior knowledge was controlled. The findings also failed to support the stance that incorporating the paraphrasing strategy with the comparative advance organizer would yield positive increases in subjects' learning and retention. Additionally, the current results are in conflict with Ausubel's (1960) assumption that simply providing an organizer without any further text processing manipulation will facilitate learning.

2. Is there a statistically significant difference in delayed retention between the experimental group receiving Treatment one (oral comparative advance organizer) and the group receiving Treatment two (oral comparative advance organizer plus paraphrasing) when controlling for learners' prior knowledge level?

This question anticipated that subjects receiving Treatment two would achieve significantly higher mean scores on the delayed posttest than the group receiving Treatment one. An analysis of the data indicated a mean score of 67.10 for Treatment two and 67.11 for the group participating in Treatment one. An interesting finding of the study was that subjects participating in Treatment one had higher mean scores on the delayed posttest than on the posttest. In a review of 135 advance organizer studies, Luiten et al. (1980) found that the

majority of the studies measured retention within the first four weeks following treatment. The authors indicated that the effect of the organizer tended to increase across time.

An analysis of the data indicated no significant differences between the groups participating in Treatment one and Treatment two when prior knowledge was controlled. The paraphrasing strategy was used because previous research has shown that learners recall significantly more of the advance organizer and the instructional content. It also provides a means for allowing learners to interact with the semantic base of the organizer, and indicates to the researcher that learners have processed the information contained in the organizer. The results show that the addition of the paraphrasing strategy to the comparative organizer failed to enhance learners' encoding of the organizer and the subsequent text as evident on the delayed posttest.

3. Is there a statistically significantly difference in immediate retention between the experimental group receiving Treatment one (oral comparative advance organizer) or the group receiving Treatment two (oral comparative advance organizer plus paraphrasing) and the control group receiving Treatment three (no oral comparative advance organizer or paraphrasing) when controlling for learners' prior knowledge level?

This question anticipated that the group participating in either Treatment one or Treatment two would achieve significantly higher mean scores on the posttest than the control group. The data revealed that the control group had a mean score of 70.54 versus 62.78 and 69.30 for Treatment one and two respectively. The results of the analysis of covariance indicated no significant differences were found on the posttest among either of the two experimental groups

when controlling for subjects' prior knowledge.

4. Is there a statistically significant difference in delayed retention between the experimental group receiving Treatment one (oral comparative advance organizer) or the group receiving Treatment two (oral comparative advance organizer plus paraphrasing) and the control group receiving Treatment three (no oral comparative advance organizer or paraphrasing) when controlling for learners' prior knowledge?

This question anticipated that the group participating in either Treatment one or Treatment two would achieve significantly higher mean scores on the delayed posttest than the control group. The data revealed that the control group had a mean score of 69.77 versus 67.11 and 67.10 for Treatment one and Treatment two respectively. The results of the analysis of covariance revealed no significant differences in the mean delayed retention scores among the three treatment groups. These findings suggest that the comparative advance organizer was no more helpful as a preinstructional strategy in facilitating retention than no organizer in the case of the control group.

The concept of advance organizers was developed by Ausubel (1960) as a strategy to promote learning and retention of material. The function of the advance organizer is "to provide ideational scaffolding for the stable incorporation and retention of the more detailed and differentiated material that follows. . ." (Ausubel, 1968, p. 148). The instructor may accomplish this by manipulating ". . . the availability to the learner of relevant and proximately inclusive subsumers. . ." (p. 136). Ausubel's work in this area advocated written advance organizers where

learners read the organizer then read the text to be learned. Since his original work, advance organizers have been widely studied and discussed. Several researchers (Alexander, Frakiewicz, & Williams, 1979; Dinnel & Glover, 1985; Feller, 1973; Ruthosky, 1993) have employed a variety of presentation formats to increase the memorability of text, written, illustrative, paraphrasing, rehearsal strategies, and oral presentation.

The comparative advance organizer serves to enhance the learners' existing schemata which allows for enhanced learning of the text to be presented (Dinnel & Glover, 1985). Despite the enormous amount of research conducted exploring the use of advance organizers, studies addressing the effects of organizers presented to learners orally followed by oral instruction are limited (Alexander, Frankiewicz, & Williams, 1979). Therefore, the purpose of this study has been to overcome this shortcoming.

The investigation was concerned with exploring the effects of a comparative advance organizer on students' learning and retention in the high school classroom setting. The independent variables examined in the study (comparative advance organizer and comparative organizer plus paraphrasing) have been studied in previous investigations; however, comparative advance organizers presented orally followed by oral instruction have not been studied simultaneously using foods and nutrition text.

The results of the present study are in conflict with past comparative advance organizer studies (Ausubel & Fitzgerald, 1961; Ausubel & Youssef, 1963; Rinehart & Welker, 1992) that have demonstrated positive effects on subjects' learning and retention. The findings of this study do not provide evidence that a comparative advance organizer promotes learning and retention

more than no organizer treatment. Subsequently, it will be difficult to draw definitive conclusions regarding its effectiveness as a preinstructional strategy.

The analysis of the data showed no significant differences among groups participating in the three treatment conditions after controlling for learners' prior knowledge level. A possible explanation for not finding significant results could be due to the low power associated with the study's sample. With a sample size of n = 32, the power observed was .168. According to Welkowitz, Ewen, and Cohen (1982), power is the probability of observing a significant result when employing statistical test of significance.

For the current study the effect size associated with measures of immediate retention for Treatment one and Treatment two was computed as -0.46 and -0.066. The effect size for the delayed retention scores for both Treatment one and Treatment two was computed as -0.25. Luiten et al. (1980) reported in their meta-analysis an average effect size of.21 for advance organizer studies measuring learning. For studies measuring retention, the data indicated that the organizer effect increased with additional days following treatment. When evaluating the influence of grade level on learning, the authors indicated an effect size of .17 for grades 9 through 12. The retention data with regard to the same grade levels showed an effect size of .26.

The majority of the studies reviewed examined the effects of advance organizers on learning using written organizers. An effect size of .17 was observed for studies using written advance organizers and .37 for"aural" presentation formats. Luiten et al. (1980) noted that in one of the four studies using "aural" advance organizer, that subjects read the organizer while listening to the instructor read the organizer aloud. The other studies used audio-visual

presentations of the advance organizer.

Recent studies (Corkill, Bruning, & Glover, 1988; Dinnel & Glover, 1985; Snapp & Glover, 1990) have found evidence to support the use of paraphrasing the organizer to promote learners' recall of the information contained in the organizer and the subsequent text. The results of this study failed to preclude the investigator from suggesting that all three treatment conditions used in the study were equally as effective in promoting leaning and retention.

Another possible explanation for the study's results may be found in the writing of Mayer and Bromage (1980). They suggest that the best test of the efficacy of advance organizers is when the subject matter is unfamiliar, technical, or difficult for the learner to associate with personal experience. Since the instructional content was not totally unfamiliar to the subjects who participated in the study, this may explain these findings. It is conceivable that the learners used in the study did not link the information in the comparative organizer with the text presented. Based on the work of Jonassen and Grabowski (1993) individual differences in leaning traits play an important role in learners' ability to mentally assimilate materials. According to Kloster and Winne (1989), simply providing the organizer is no assurance that learners will use the organizer to enhance learning and retention. Derry (1984) suggests that learners must be instructed to use the information contained in the organizer in order to benefit from it use in promoting learning.

The results of the study are consistent with the findings reported by several researchers (Feller, 1973; Shmurak, 1974; Ruthkosky, 1993). These studies found no facilitative effects of using advance organizers. Ruthkosky (1993) controlled for learners' prior knowledge level of

human physiology material and found after removing the effects of prior knowledge, there were no significant differences observed in the five treatment conditions. Each of these studies was conducted using different content, organizer formats, and types of learners than the organizer used in the present study. Because this study was concerned with learning and retention from material presented orally preceded by an oral advance organizer, careful judgement must be exercised in comparing past findings with the results of the present investigation.

Both the Feller (1973) and Ruthoksoky (1993) studies reported an interesting finding concerning the mean scores of the control groups. These studies showed that the groups receiving the advance organizer treatments had lower mean scores than the control groups. This finding was evident in the present study. The experimental groups participating in the two comparative advance organizer treatments had lower scores on both the posttest and delayed posttest than the control group.

There are several factors that may affect the interpretation of the current results. First, the study used intact classes composed of students with varying ability levels. The investigator attempted to minimize the impact of this factor by randomly assigning subjects to the three treatment conditions. Secondly, the overall small sample size (n=44). Third, subject mortality (n=32). Fourth, the sample was composed of high school students representing grades 9 through 12. Additionally, students possessed varying levels of prior knowledge relative to the instructional content. Cumulatively, these factors should be considered when interpreting the present findings.

RECOMMENDATIONS

Based on findings of the study, the following areas of further research are recommended:

1. In regard to future research efforts employing comparative advance organizers, it is recommended that investigators control for subjects' prior knowledge of the subject matter.
2. The present study should be replicated with a larger sample, using similar subject matter, and within the high school setting.
3. The comparative advance organizer used in the investigation was presented in a oral format to the learners. Previous studies have provided support for using different formats for advance organizers. No studies have addressed the efficacy of using comparative organizers in different formats (written and illustrative) for presenting foods and nutrition text. Because of individual differences in learners' aabilityto comprehend and process information, future studies may address this issue in relation to the effectiveness of the comparative advance organizer.
4. In the present study, no data were collected regarding subjects' posttest and delayed test duration. These data may have been beneficial to the researcher in explaining the results. It is conceivable that some subjects who completed the test before the 20 minutes allotted may have misread some of the questions. This may account for some of the low levels of recall among some students. The researcher recommends that future studies gather data concerning time on task for the posttest

and delayed posttest.

5. In the present study, the sample was comprised of a mixture of grade levels (9 through 12). It is recommended that subjects should all be of equal grade levels.

REFERENCE LIST

Alabama State Department of Education. (1990). Alabama course of study: Home economics. (Bulletin 1990, No. 58). Montgomery, AL. Alabama State Department of Education.

Alexander, L., Frankiewicz, R.G., & Williams, R.E. (1979). Facilitation of learning and retention of oral instruction using advance and post organizers. Journal of Educational Psychology, 71, 701-707.

Ausubel, D.P. (1960). The use of advance organizers in the learning and retention of meaningful verbal material. Journal of Educational Psychology, 51, 267-272.

Ausubel, D.P., & Fitzgerald, D. (1961). The role of discriminability in meaningful verbal learning and retention. Journal of Educational Psychology, 52, 266-274.

Ausubel, D.P. (1963). The psychology of meaningful learning. New York: Grune & Stratton.

Ausubel, D.P., & Youssef, M. (1963). Role of discriminability in meaningful parallel learning. Journal of Educational Psychology, 54, 331-336.

Ausubel, D.P. (1968). Educational psychology: A cognitive view. New York: Holt, Rinehart & Wilson.

Ausubel, D.P. (1978). In defense of advance organizers : A reply to the critics. Review of Education Research, 48, 251-257.

Barnes, B.R., & Clawson, E.U. (1975). Do advance organizers facilitate learning? Recommendations for further research based on an analysis of 32 studies. Review of Educational Research, 45, 251-157.

Clark, C.H., & Bean, T.W. (1982). Improving advance organizer research: Persistent problems and future directions. Reading World, 22 (1), 2-10.

Corkill, A.J., Bruning, R.H., & Glover, J.A. (1988). Advance organizers: Concrete versus abstract. Journal of Educational Research, 82, 76-81.

Corkill, A.J., Bruning, R.H., Glover, J.A., & Krug, D. (1988). Advance organizers: Retrieval context hypotheses. Journal of Educational Psychology, 80, 304-311.

Dick, W., & Carey, L. (1990). The systematic design of instruction. (3rd ed.) Glenview, IL: Scott, Foreman.

Dinnel, D., & Glover, J.A. (1985). Advance organizers: Encoding manipulations. Journal of Educational Psychology, 77, 514-521.

Derry, S.J. (1984). Effects of an organizer on memory for prose. Journal of Educational Psychology, 76, 98-107.

Feller, W.A. (1973). The effects of two types of advance organizers and two types of spaced questions on the ability of a selected group of tenth grade biology students to recall, comprehend, and apply facts from written science material (Doctoral dissertation, Temple University, 1973). Dissertation Abstracts International, 34, 1766A.

Gagne', R.M., Briggs, L.J., & Wager, W.W. (1992). Principles of instructional design. (4th ed.). Fort Worth: Harcourt Brace Jovanovich.

Gay, L.R. (1992). Educational research: Competencies for analysis and application. (4th ed.). New York: Merrill Publishing.

Glover, J.A., Bullock, R.G., & Dietzer, M.L. (1990). Advance organizers: Delay hypotheses. Journal of Educational Psychology, 82, 291-297.

Hartley, J., & Davies, I.K. (1976). Preinstructional strategies: The role of pretests, behavioral objectives, overviews and advance organizers. Review of Educational Research, 46, 239-265.

Jonassen, D.H. & Grabowski, B.L. (1993). Handbook of individual differences, learning, and instruction. Hillsdale, NJ: Lawrence Erlbaum Associates.

Kloster, A.M., & Winne, P.H. (1989). The effects of different types of organizers on students' learning from text. Journal of Educational Psychology, 81, 9-15.

Luiten, J., Ames, W., & Ackerson, G. (1980). A meta-analysis of the effects of advance organizers on learning and retention. American Educational Research Journal, 17, 211-218.

Mayer, R.E. (1979a). Can advance organizers influence meaningful learning? Review of Educational Research, 49, 371-383.

Mayer, R.E. & Bromage, B.K. (1980). Different recall protocols for technical texts due to

advance organizers. Journal of Educational Psychology, 72, 209-225.

McEneany, J.E. (1990). Do advance organizers facilitate learning? A review of subsumption theory. Journal of Research and Development in Education, 23, 89-96.

Rinehart, S.D., & Welker, W.A. (1992). Effects of advance organizers on level and time of text recall. Reading Research and Instruction, 32, 77-86.

Ruthkosky, K.O. (1993). The effects of adding visualization and rehearsal strategies to advance organizers on facilitating long term retention. (Doctoral dissertation, The Pennsylvania State University, 1993). Dissertation Abstracts International, 54, 1744A.

Schmurak, C.B. (1974). The effects of varying cognitive style of advance organizers on learning of expository science material by eighth graders. (Doctoral dissertation, Indiana University, 1974). Dissertation Abstracts International, 35, 2075A.

Snapp, J.C., & Glover, J.A. (1990). Advance organizers and study questions. Journal of Educational Research, 83, 266-271.

Stone, C.L. (1983). A meta-analysis of advance organizer studies. Journal of Experimental Education, 51, 194-199.

Turner, J. (1995). 101 ways to save money (Circular HE-562). Auburn University: Alabama Cooperative Extension Service.

U.S. Department of Agriculture. (1992). USDA backgrounder (No. 0399-92). Washington, DC: U.S. Government Printing Office.

U.S. Department of Agriculture & U.S. Department of Health and Human Services. (1992). Food guide pyramid (Home and Garden Bulletin 252). Washington, DC: U.S. Government Printing Office.

U.S. Department of Agriculture & U.S. Department of Health and Human Services. (1995). Nutrition and your health: Dietary guidelines for americans (Home and Garden Bulletin 232). Washington, DC: U.S. Government Printing Office.

Welkowitz, J., Ewen, R.B., & Cohen, J. (1982). Introductory statistics for the behavioral sciences. (3rd ed.). New York: Academic Press.

West, C.K., Farmer, J.A., & Wolf, P.M. (1991). Instructional design: Implications from cognitive science. Boston: Allyn & Bacon.

Williams, T.R., & Butterfield, E.C. (1992a). Advance organizers: A review of the research-Part I. Journal of Technical Writing and Communication, 22, 259-272.

WordPerfect 6.1 for Windows. (1994). Novell, Inc.